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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,472	02/22/2002	Akito Yoshida	W2K 1077	4326

23504 7590 05/11/2004

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EXAMINER

ZARNEKE, DAVID A

ART UNIT PAPER NUMBER

2827

DATE MAILED: 05/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/082,472

Applicant(s)

YOSHIDA, AKITO

Examiner

David A. Zarneke

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9 February 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
4a) Of the above claim(s) 13-20 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-12 and 21-28 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/9/04 has been entered.

Response to Arguments

Applicant's arguments filed 2/09/04, with respect to the rejection(s) of claim(s) 1-12 and 21-28 under 35 U.S.C. 102(b) and (e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Isaak, US Patent 6,351,029, as taught below.

Claim Objections

Claim 1 is objected to because of the following informalities: This claim ends with the word "and" with no further limitations added. Appropriate correction is required.

For examination purposes the examiner assumes that word "and" is not present and that the claim ends with "substrate".

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 21 recites the limitation "means" in lines 8 and 17. There is insufficient antecedent basis for this limitation in the claim.

For examination purposes, it is assumed that this "means" is intended to refer to the "flexible tape structure".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 5 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Isaak, US Patent 6,351,029.

Isaak (figures 17-19) teaches a semiconductor stacking structure comprising:

a first semiconductor device (108); and

a flexible tape substrate (104) having metal layers for electrical connections

wherein the flexible tape substrate is coupled (through the use of solder balls) to a

bottom surface of the first semiconductor device via the metal layers (11, 32+), the flexible substrate being folded over on at least two sides to form flap portions which are coupled to an upper surface of the first semiconductor device, the flap portions not overlapping one another and covering only a portion of the upper surface of the first semiconductor device which is smaller than the upper surface of the first semiconductor device, the flexible substrate used for stacking additional semiconductor devices (14, 10+) the flap portions wherein the additional semiconductor devices are coupled to the metal layers of the flexible substrate (figures 8, 9 and 15).

Regarding claim 2, Isaak teaches an adhesive layer (124) which is placed on the flap portions of the flexible substrate and which couples the flap portions to the first semiconductor device (9, 55+).

With respect to claim 4, Isaak teaches a second semiconductor device coupled to the flap portions the flexible substrate (figure 7).

As to claim 5, Isaak teaches the second semiconductor device is coupled to the flap portions of the flexible substrate after flap portions are folded over coupled the first semiconductor device (figure 7).

In re claim 8, Isaak teaches a BGA structure (3, 21+).

Claims 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Isaak, US Patent 6,351,029.

Isaak (figures 17-19) teaches a semiconductor stacking structure comprising:
first semiconductor device (108); and

means (104) having metal layers for electrical connections coupled (through the use of solder balls) to a bottom surface of the first semiconductor device via the metal layers for forming the semiconductor stacking structure (11, 32+), wherein the means is folded over on at least two sides so as to not overlap and coupled to an upper surface of the first semiconductor device and covers only a portion of the upper surface semiconductor device which is smaller than the upper surface of the first semiconductor device, the flexible substrate used for stacking additional semiconductor devices on folded over portions of the means, the additional semiconductor devices coupled to the metal layers of the means (figure 7).

Regarding claim 12, Isaak teaches an adhesive layer (124) placed on the means for coupling the means to the upper surface of the first semiconductor device.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 3, 7, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaak, US Patent 6,351,029, as applied to claim 1 above.

In re claim 3, Isaak fails to teach the means placed on the upper surface of the first semiconductor device for coupling the flap portions to the first semiconductor device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to place the means on the upper surface of the first semiconductor device for coupling the flap portions to the first semiconductor device because it is an obvious matter of design choice. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(I), (IVA) & (IVB)).

Regarding claims 7 and 9, Isaak, which teaches the use of a BGA device (3, 21+), fails to teach the stacking structure as being a LGA device (claim 7) and a lead type device (claim 9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a LGA or a lead type device in place of a BGA because they are all functional equivalent techniques used to attach devices to substrates.

The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

With respect to claim 10, Isaak fails to teach the means folded over on four sides in this particular embodiment.

Isaak (figures 1 and 2) teach an alternative embodiment wherein the means is folded over on four sides.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the four sided fold of Isaak's alternative embodiment in place of the two sided fold of Isaak's present embodiment because the four sided fold increases the number of connecting points to the device stacked thereon thereby improving the electrical connection between the two devices.

Claims 21-25, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaak, US Patent 6,351,029.

Isaak (figures 17-19) teaches a semiconductor stacking structure comprising:
a first semiconductor device (108); and
a flexible tape substrate (104) having metal layers on a top and bottom surface for electrical connections, the flexible tape substrate coupled (through the use of solder balls) to a bottom surface of first semiconductor device via the metal layers for forming the semiconductor stacking structure wherein means folded over on two sides so as to not overlap to form flap portions which are coupled to an upper surface of the first semiconductor device and covers only portion of the upper surface of the first semiconductor device which smaller than the upper surface of the semiconductor device, the flap portions increasing connect density of the semiconductor stacking structure and used for stacking additional semiconductor devices on the first

semiconductor, the additional semiconductor devices coupled to the metal layers of the means.

Isaak fails to teach the means folded over on four sides in this particular embodiment.

Isaak (figures 1 and 2) teach an alternative embodiment wherein the means is folded over on four sides.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the four sided fold of Isaak's alternative embodiment in place of the two sided fold of Isaak's present embodiment because the four sided fold increases the number of connecting points to the device stacked thereon thereby improving the electrical connection between the two devices.

Regarding claim 22, Isaak teaches an adhesive layer (124) which is placed on the flap portions of the flexible substrate and which couples the flap portions to the first semiconductor device (9, 55+).

In re claim 23, Isaak fails to teach the means placed on the upper surface of the first semiconductor device for coupling the flap portions to the first semiconductor device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to place the means on the upper surface of the first semiconductor device for coupling the flap portions to the first semiconductor device because it is an obvious matter of design choice. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(I), (IVA) & (IVB)).

With respect to claim 24, Isaak teaches a second semiconductor device coupled to the flap portions the flexible substrate (figure 7).

As to claim 25, Isaak teaches the second semiconductor device is coupled to the flap portions of the flexible substrate after flap portions are folded over coupled the first semiconductor device (figure 7).

Regarding claim 27, Isaak, which teaches the use of a BGA device (3, 21+), fails to teach the stacking structure as being a LGA device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a LGA in place of a BGA because they are both functional equivalent techniques used to attach devices to substrates.

The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

In re claim 28, Isaak teaches a BGA structure (figure 7, 3, 21+ & 10, 33+).

Claims 6 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaak, US Patent 6,351,029, as applied to claims 1 and 21 respectively above, and further in view of Iwase, US Patent 6,172,418, or Hashimoto, US Patent 6,486,544, or Kim et al., US Patent 6,225,688, or Nicewarner, Jr., US Patent 5,776,797.

Isaak fails to teach the 2nd device coupled to the flap portions of the flexible substrate before the flap portions are folded over and coupled to the 1st device.

Iwase, Hashimoto, Kim and Nicewarner all teach a stacked chip package wherein chips are placed on a flexible insulating film before folding into a stacked package.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the device attached to the flaps before folding of Iwase, Hashimoto, Kim and Nicewarner in the invention of Isaak because these references teach that it is conventionally known in the art to form stacked packages in this manner.

The use of conventional materials to perform their known functions in a conventional process is obvious (MPEP 2144.07).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-F 10 AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571)-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2827

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David A. Zarneke
Primary Examiner
May 6, 2004